

WE CLAIM:

1. A system for monitoring performance, reliability and condition of apparatus used with machines comprising:

a computer chip positioned with a line replaceable unit and in communication with a smart data memory module; and

5 said smart data memory module positioned with a machine operating with said line replaceable unit and in communication with an electronic control unit.

2. The system as in claim 1 wherein the electronic control unit is in communication with a performance monitoring system.

3. The system as in claim 2 wherein the performance monitoring system comprises an aircraft communication address reporting system and a trend monitoring system.

4. The system as in claim 1 wherein said computer chip receives and stores a set of as built data for said line replaceable unit.

5. The system as in claim 1 wherein said computer chip receives and stores a set of operational data from sensors of said line replaceable unit.

6. The system as in claim 1 wherein said smart data memory module receives and stores a set of as built data associated with said line replaceable unit.

7. The system as in claim 1 wherein said smart data memory module receives and stores a plurality of sets of operational data transmitted from said

line replaceable unit.

8. The system as in claim 4 wherein said set of as built data comprising a part number, a serial number, a unit performance characteristics, a place of manufacture, a new and repair status, and a type of repair.

9. The system as in claim 6 wherein said set of as built data comprising a part number, a serial number, a unit performance characteristics, a place of manufacture, a new and repair status, and a type of repair.

10. The system as in claim 5 wherein said set of operational data comprising an hours accumulated, a number of starts accumulated and a built in test results that have occurred during specified time periods wherein each data set is identified as to time of occurrence.

11. The system as in claim 7 wherein said plurality of sets set of operational data comprising an hours accumulated, a number of starts accumulated and a built in test results that have occurred during specified time periods wherein each data set is identified as to time of occurrence.

12. A system for monitoring performance, reliability and condition of apparatus used with machines comprising:

a computer chip positioned with a line replaceable unit for receiving and storing a set of as built data for said line replaceable unit, and for  
5 receiving and storing a set of operational data from sensors of said line replaceable unit;

a smart data memory module positioned with a machine operating with a plurality of line replaceable units and in communication with said computer chip of each line replaceable unit wherein said smart data memory

- 10 module receives and stores a set of as built data associated with each line replaceable unit and receives and stores a plurality of sets of operational data transmitted from each line replaceable unit;  
an electronic control unit in communication with said smart data memory module; and
- 15 a smart trend monitor element operating in said electronic control unit wherein said set of as built data and said sets of operational data are compared to determine the operational state of each line replaceable unit.

13. The system as in claim 12 wherein said set of as built data comprising part number, serial number, unit performance characteristics, place of manufacture, new and repair status, and type of repair.

14. The system as in claim 12 wherein said sets of operational data comprising hours accumulated, number of starts accumulated and built in test results that have occurred during specified time periods wherein each data set is identified as to time of occurrence.

15. A method for determining maintenance requirements for an apparatus operating with machinery, comprising the steps of:

- locating a computer chip with a line replaceable unit and providing communication with a smart data memory module;
- 5 storing as built data in the computer chip;
- monitoring and storing operational data from said line replaceable unit in the computer chip;
- placing an electronic control unit in communication with said smart data memory module;
- 10 communicating with said computer chip to determine the part number and serial number thereof;

- comparing the received part number and the serial number with  
the data stored in the smart data memory module;
- retrieving and storing the as built data in said line replaceable unit
- 15 if the part number and the serial number do not match;  
          retrieving and storing the operational data of said line replaceable  
unit in said smart data memory module;
- presenting the as built data and the operational data to a smart  
trend monitor element; and
- 20       comparing the as built data and the operational data in said smart  
trend monitoring element to determine the operational state of said line  
replaceable unit.

16. The method as in claim 15 further comprising the step of:  
communicating the results of the comparison of the as built data and the  
operational data to a performance monitoring system.

17. The method as in claim 15 further comprising the steps of:  
determining if said line replaceable unit is pending failure; and  
generating a signal for a pending failure.